capacitance meter

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W van der Voet

The capacitance meter, which is attractive and easy to build, has five measurement ranges and allows the test result to be displayed on an analogue or a digital meter.

Gates IC_{1a} and IC_{1b} are arranged as an astable multivibrator (AVM), whose frequency is determined by capacitor C_2 and the resistor, R_1, R_2, or R_3, selected with switch S_1.

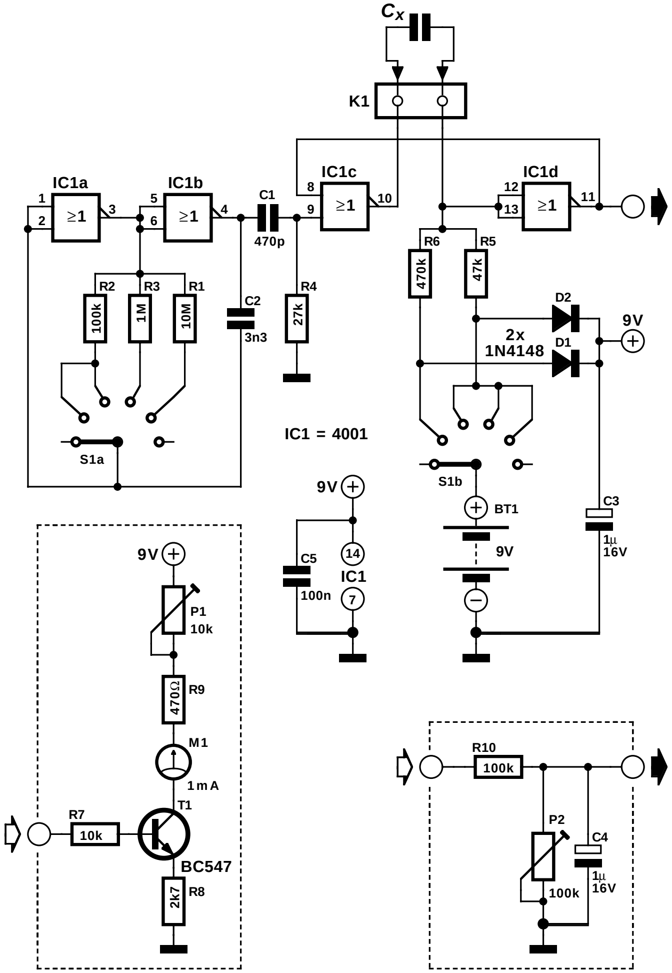
The output of the multivibrator is applied to a monostable multivibrator (MMV) formed by IC_{1c} and IC_{1d}. The pulses generated by the AMV appear in integrated form at the output of the MMV for a period of time determined by the capacitor on test, C_x, and the resistor, R_5 or R_6, selected with S_1. It follows that the pulse duration (width) at the output of IC_{1d} is directly proportional to the value of C_x.

The values of resistors R_1–R_6 enable five ranges to be selected with S_1, starting with 0–100 pF in position 1 to 0–1 µF in position 5.

The boxes in the diagram show two ways of displaying the measurement result. A standard BC547 transistor is capable of driving a moving coil meter, M_1, which may be calibrated with the aid of preset P_1. The other way is the use of a variable potential divider and integrator to which a digital voltmeter may be connected.

The meter is calibrated with the aid of a number of capacitors of accurately known value for each of the ranges. Set switch S_1 to range 1, connect one of the test capacitors (of relevant value!) across the test terminals and adjust P_1 or P_2, as the case may be, until the meter reading coincides with the value of the capacitor.

The accuracy of the meter is, of course, dependent on the tolerance of the resistors , which should therefore be 1% in all cases.



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